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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,518	09/25/2001	Nagabhushana T. Sindhushayana	000400	3313

23696 7590 10/21/2005

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/965,518	SINDHUSHAYANA ET AL.
	Examiner	Art Unit
	Juan A. Torres	2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 27 September 2005.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-24 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-24 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 27 September 2005 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to because:

In FIG. 6 block 651 labeled as "$M(x_i, C_i)$" is indefinite, it is suggested to be changed to "$M(X_i, C_i$" see page 13 paragraph [00031].

In FIG. 6 block 654 labeled as "$M(D_k, z_k)$" is indefinite, it is suggested to be changed to "$M(D_k, Z_k)$" see page 20 paragraph [00041].

In FIG. 6 block 655 labeled as "$M(z_k, D_k)$" is indefinite, it is suggested to be changed to "$M(Z_k, D_k)$".

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include at least the following reference character(s) not mentioned in the description: "658", "656", "661", "662", "663", "664", "670", "669", "671", "672", "673", "674", "675", "676", "655", "603", "660". Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective

action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "707", "704", "702", "701", "706", "705", "708" has been used to designate both states i-1 and i and i+1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Figures 1, 2, 3, and 4 should be designated by a legend such as --Prior Art-- **because only that which is old is illustrated** (see US5933462 and US5446747). See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

In view of the amendment filed on 09/27/2005, the Examiner withdraws claim objections of the previous Office action.

Claim Rejections - 35 USC § 112

In view of the amendment filed on 09/27/2005, the Examiner withdraws claim rejections under 112 of the previous Office action.

Response to Arguments

Applicant's arguments filed on 09/27/2005 have been fully considered but they are not persuasive.

Regarding claims 1, 18 and 22; and 15-16

The Applicant contends, "admitted prior art shown in Fig. 5 do not teach nor suggest the claimed features of "updating channel nodes Rx, Ry and Rz" and "initializing outgoing messages from symbol node Xi Yi and Zk."

The Examiner appears to equate the claimed "channel nodes Rx, Ry and Rz" with the inputs to decoder 501 and the input 540 to decoder 502 as shown in Fig. 5 and also equates the claimed "symbol nodes Xi, Yi and Zk" with outputs 550, 542 and 540, respectively. However, such inputs to decoders 501 and 502 are not channel nodes

because a node hold information, but input to such decoders are closer in nature to "messages" and not channel nodes. Nor are the outputs 550, 542 and 540 symbol nodes because such outputs again are messages.".

The Examiner disagrees and asserts, as indicated in the previous Office action, admitted prior art in FIG. 5 shows a method for decoding a sequence of turbo encoded data symbols transmitted over a channel comprising: updating channel nodes R_x, R_y and R_z based on a received channel output (in FIG. 5 R_x is block 501 input 541 and 542; R_y is block 501 input 542 and R_z is block 502 input 540); initializing outgoing messages from symbol nodes X_i, Y_i and Z_k wherein said symbol nodes X_i, Y_i and Z_k are in communication with said channel nodes R_x, R_y and R_z (X_i, is block 501 output 550; Y_i is output of block 520 line 542 and Z_k is output of block 520 line 540); and triggering updates of computational nodes C and D, (computational node C is block 501 and computational node D is block 502) associated with different instances of time, in accordance with a triggering schedule, wherein a computational node C_i is in communication with said symbol nodes X_i, and Y_i and a computational node D_k is in communication with said symbol nodes X_i and Z_k.(FIG. 5 input of block 501 – C – have inputs X_i, and Y_i and block 502 – D – have inputs X_i and Z_k).

The Examiner also indicated that the specification in paragraph [0033] states, as it is very well known in the turbo decoding process, that "A node may not necessarily store or hold any information at any time. A node may be "updated" by an incoming message. When a node is "updated," the node outputs a message on all of its outgoing branches based on the current value of the messages at its incoming branches. The

type of messages on the outgoing branches of a node also depends on the type of the node".

For these reasons and the reason stated en the previous Office Action, the rejection of claims 1, 18, 22 and 15-16 are maintained.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-14 and 17-25 are rejected under 35 U.S.C. 102(a) as being anticipated by admitted prior art FIG. 5).

As per claim 1, Admission in FIG. 5 shows a method for decoding a sequence of turbo encoded data symbols transmitted over a channel comprising: updating channel nodes R_x, R_y and R_z based on a received channel output (in FIG. 5 R_x is block 501 input 541 and 542; R_y is block 501 input 542 and R_z is block 502 input 540); initializing outgoing messages from symbol nodes X_i, Y_i and Z_k wherein said symbol nodes X_i, Y_i and Z_k are in communication with said channel nodes R_x, R_y and R_z (X_i, is block 501 output 550; Y_i is output of block 520 line 542 and Z_k is output of block 520 line 540); and triggering updates of computational nodes C and D, (computational node C is block 501 and computational node D is block 502) associated with different instances of time, in accordance with a triggering schedule, wherein a computational node C_i is in communication with said symbol nodes X_i, and Y_i and a computational node D_k is in

communication with said symbol nodes X_i and Z_k.(FIG. 5 input of block 501 – C – have inputs X_i, and Y_i and block 502 – D – have inputs X_i and Z_k).

As per claim 2, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the computational node C_i is in communication with state nodes S_i and S_{i-1}, associated with a first constituent code (FIG. 5 input of block 501 – C – have inputs X_i, with be related to S_i and output X_i will be related with S_{i-1}), and said computational node D_k is in communication with state node [$_k$ and [$_{k-1}$ associated with a second constituent code, wherein said first and second constituent codes are associated with a turbo code in said communication system used for encoding said sequence of encoded data symbols (FIG. 5 block 501 – C – have inputs X_i, with be related to S_i and output X_i will be related with S_{i-1} and block 502 – D – have inputs X_k, with be related to [$_{k-1}$ and output X_k will be related with [$_k$) .

As per claim 3, Admission in FIG. 5 shows a method for decoding a sequence of turbo code comprising accepting a value of symbol X_i at said symbol node X_i as a decoded value of symbol X_i after at least one iteration of said triggering updates of said computational nodes C and D (FIG. 5 output of block 501 line 550 after the first cycle).

As per claim 4, Admission in FIG. 5 shows a method for decoding a sequence of turbo code wherein said triggering schedule includes triggering said computational nodes C and D at different instances of time essentially concurrently (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530).

As per claim 5, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the triggering schedule includes triggering the computational nodes C (block 501) and D (block 502) at different instances of time in a sequence of C_0, C_1, C_2, . . . , C_N, C_{N-1}, C_{N-2}, C_{N-3}, . . . C_2, C_1, C_0, D_0, D_1, D_2, . . . , D_N, D_{N-1}, D_{N-2}, D_{N-3}, . . . D_2, D_1, D_0 (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations).

As per claim 6, Admission in FIG. 5 shows a method for decoding a sequence of turbo code partitioning the computational node C at time instances C_0, C_1, C_2, ... , C_N into at least two subsets, where the triggering schedule includes triggering updates of computational nodes C in a sequence at different time instances in each subset (FIG. 5 input 541 of block 501 wait until block 502 produces its output 560 and that output is deinterleaved by block 531 and this process is repeated until a determined number of iterations that define a number of subsets).

As per claim 7, Admission in FIG. 5 shows a method for decoding a sequence of turbo code determining the sequence at different time instances in each subset for said triggering updates FIG. 5 input 541 of block 501 wait until block 502 produces its output 560 and that output is deinterleaved by block 531 and this process is repeated until a determined number of iterations that define a number of subsets that happen a different time instances, each iteration wait for the previous iteration).

As per claim 8, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where triggering the computational node C at different time instances in at

least two subsets occurs concurrently FIG. 5 input 541 of block 501 wait until block 502 produces its output 560 and that output is deinterleaved by block 531 and this process is repeated until a determined number of iterations that define a number of subsets that happen a different time instances, each iteration wait for the previous iteration. The block 501 will hold the value Y_i of waiting for the next value of X_i, X_{i+1}).

As per claim 9, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where least two subsets of computational node C at different time instances $C_0, C_1, C_2, \ldots, C_N$ have at least one common computational node time instance FIG. 5 input 541 of block 501 wait until block 502 produces its output 560 and that output is deinterleaved by block 531 and this process is repeated until a determined number of iterations that define a number of subsets that happen a different time instances, each iteration wait for the previous iteration. The block 501 will hold the value Y_i of waiting for the next value of X_i, X_{i+1} that will be in a common computational node time instance).

As per claim 10, Admission in FIG. 5 shows a method for decoding a sequence of turbo code partitioning computational node D at different time instances $D_0, D_1, D_2, \ldots, D_N$ into at least two subsets, wherein said triggering schedule includes triggering computational nodes D at different time instances in a sequence in each subset (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations that define a number of subsets).

As per claim 11, Admission in FIG. 5 shows a method for decoding a sequence of turbo code comprising determining the sequence at different time instances in each

subset for the triggering updates (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations that define a number of subsets that happen a different time instances, each iteration wait for the previous iteration).

As per claim 12, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the triggering of computational node D at different time instance in said least two subsets occurs concurrently (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations that define a number of subsets that happen a different time instances, each iteration wait for the previous iteration. The block 502 will hold the value Z_k of waiting for the next value of X_k, X_{k+1}).

As per claim 13, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the subsets of computational node D at time instances D_0, D_1, D_2, … , D_N have at least one common computational node time instance (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations that define a number of subsets that happen a different time instances, each iteration wait for the previous iteration. The block 502 will hold the value Z_k of waiting for the next value of X_k, X_{k+1} that will be in a common computational node time instance).

As per claim 14, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the updating includes summing incoming messages to produce an output message, and outputting the output message for updating (FIG. 5 input 541 of

block 501 X_i 2nd estimation will produce an updated output in 550 that will be the third estimation).

As per claim 17, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the sequence of data includes "N" number of symbols, each symbol in said sequence is identified by either a subscript "i" or "k," and the subscript "i" and "k" are references to time instances in the decoding process (FIG. 5 subscript "i" is input to block 501 related with not-interleaved data and subscript "k" is input to block 502 related with interleaved data).

As per claim 18, Admission in FIG. 5 shows a method for decoding a sequence of turbo encoded data symbols transmitted over a channel comprising: updating channel nodes R_x, R_y and R_z based on a received channel output (in FIG. 5 R_x is block 501 input 541 and 542; R_y is block 501 input 542 and R_z is block 502 input 540); initializing outgoing messages from symbol nodes X_i, Y_i and Z_k wherein said symbol nodes X_i, Y_i and Z_k are in communication with said channel nodes R_x, R_y and R_z (X_i, is block 501 output 550; Y_i is output of block 520 line 542 and Z_k is output of block 520 line 540); state nodes S_i and S_{i-1} associated with a first constituent code in a turbo code (in FIG. 5 block 501 output 550 and inputs 541 and 542); state nodes $[_k$ and $[_{k-1}$ associated with a second constituent code in said turbo code (in FIG. 5 block 502 output 560 and inputs 540 and 532); a computational node C_i in communication with said symbol nodes X_i and Y_i (computational node C_i is block 501); and a computational node D_k in communication with said symbol nodes X_i and Z_k (computational node D_k is block 502), where said computational node C_i is in communication with said state nodes S_i

and S_{i-1} (in FIG. 5 block 501 output 550 and inputs 541 and 542) and said computational node D_k is in communication with said state nodes $[_k$ and $[_{k-1}$ (in FIG. 5 block 502 output 560 and inputs 540 and 532); a computational node C_{i+1} in communication with the state node S_i (in FIG. 5 block 501 inputs 541 and 542); a computational node C_{i-1}, in communication with said state node S_{i-1} (in FIG. 5 block 501 output 550); a computational node D_{k+1} in communication with said state node $[_k$ (in FIG. 5 block 502 inputs 540 and 532); and a computational node D_{k-1} in communication with said state node $[_{k+1}$ (in FIG. 5 block 502 output 560), where computational nodes C and D at different time instances are configured for updates in accordance with a update triggering schedule.

As per claim 19, Admission in FIG. 5 shows a method for decoding a sequence of turbo where the update triggering schedule includes triggering updates of said computational nodes C and D in a sequence of $C_0, C_1, C_2, \ldots, C_N, C_{N-1}, C_{N-2}, C_{N-3}, \ldots C_2, C_1, C_0, D_0, D_1, D_2, \ldots, D_N, D_{N-1}, D_{N-2}, D_{N-3}, \ldots D_2, D_1, D_0$ (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations).

As per claim 20, Admission in FIG. 5 shows a method for decoding a sequence of turbo where the update triggering schedule includes triggering updates in a sequence in a partitioned computational nodes $C_0, C_1, C_2, \ldots, C_N$ of at least two subsets and in a sequence in a partitioned computational nodes $D_0, D_1, D_2, \ldots, D_N$ of at least two subsets (FIG. 5 input 541 of block 501 wait until block 502 produces its output 560 and that output is deinterleaved by block 531 and this process is repeated until a determined

number of iterations that define a number of subsets, input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations that define a number of subsets).

As per claim 21, Admission in FIG. 5 shows a method for decoding a sequence of turbo where the sequence of data includes "N" number of symbols, wherein each symbol in said sequence is identified by either a subscript "i" or "k" corresponding to the subscripts used for said state nodes and said computational nodes (FIG. 5 subscript “i” is input to block 501 related with not-interleaved data and subscript “k” is input to block 502 related with interleaved data).

As per claim 22, Admission in FIG. 5 shows a processor configured for decoding a sequence of turbo encoded data symbols for communication over a channel comprising: channel nodes R_x, R_y and R_z for receiving channel output (in FIG. 5 R_x is block 501 input 541 and 542; R_y is block 501 input 542 and R_z is block 502 input 540); symbol nodes X_i, Y_i and Z_k in communication with the channel nodes R_x, R_y and R_z (X_i, is block 501 output 550; Y_i is output of block 520 line 542 and Z_k is output of block 520 line 540); state nodes S_i and S_{i-1} associated with a first constituent code in a turbo code (in FIG. 5 block 501 output 550 and inputs 541 and 542); state nodes [$_k$ and [$_{k-1}$ associated with a second constituent code in the turbo code (in FIG. 5 block 502 output 560 and inputs 540 and 532); a computational node C_i in communication with the symbol nodes X_i and Y_i (computational node C_i is block 501); and a computational node D_k in communication with the symbol nodes X_k and Y_k (computational node D_k is block

502), where the computational node C_i is in communication with the state nodes S_i and S_{i-1} (in FIG. 5 block 501 output 550 and inputs 541 and 542) and the computational node D_k is in communication with the state nodes $[_k$ and $[_{k-1}$ (in FIG. 5 block 502 output 560 and inputs 540 and 532); a computational node C_{i+1} in communication with the state node S_i (in FIG. 5 block 501 inputs 541 and 542); a computational node C_{i-1} in communication with the state node S_{i-1} (in FIG. 5 block 501 inputs 541 and 542); a computational node D_{k+1} in communication with the state node $[_k$ (in FIG. 5 block 502 inputs 540 and 532); and a computational node D_{k-1} in communication with the state node $[_{k+1}$ (in FIG. 5 block 502 output 560), wherein computational nodes C and D at different time instances are configured for updates in accordance with a update triggering schedule.

As per claim 23, Admission in FIG. 5 shows a processor where the update triggering schedule includes triggering updates of the computational nodes C and D in a sequence of C_0, C_1, C_2, . . . , C_N, C_{N-1}, C_{N-2}, C_{N-3}, . . . C_2, C_1, C_0, D_0, D_1, D_2, . . . , D_N, D_{N-1}, D_{N-2}, D_{N-3}, . . . D_2, D_1, D_0 (FIG. 5 input 532 of block 502 wait until block 501 produces its output 550 and that output is interleaved by block 530 and this process is repeated until a determined number of iterations).

As per claim 24, Admission in FIG. 5 shows a processor where the sequence of data includes "N" number of symbols, wherein each symbol in said sequence is identified by either a subscript "i" or "k" corresponding to the subscripts used for said state nodes and said computational nodes (FIG. 5 subscript "i" is input to block 501

related with not-interleaved data and subscript "k" is input to block 502 related with interleaved data).

As per claim 25, Admission in FIG. 5 shows an apparatus for decoding a sequence of turbo encoded data symbols for communication over a channel comprising: means for channel nodes R_x, R_y and R_z for receiving channel output (in FIG. 5 R_x is block 501 input 541 and 542; R_y is block 501 input 542 and R_z is block 502 input 540); means for symbol nodes X_i, Y_i and Z_k in communication with said channel nodes R_x, R_y and R_z (X_i, is block 501 output 550; Y_i is output of block 520 line 542 and Z_k is output of block 520 line 540); means for state nodes S_i and S_{i-1} associated with a first constituent code in a turbo code (in FIG. 5 block 501 output 550 and inputs 541 and 542); means for state nodes $[_k$ and $[_{k-1}$ associated with a second constituent code in said turbo code (in FIG. 5 block 502 output 560 and inputs 540 and 532); means for a computational node C_i in communication with said symbol nodes X_i and Y_i (computational node C_i is block 501); and a computational node D_k in communication with said symbol nodes X_i and Z_k (computational node D_k is block 502); means for a computational node D_k in communication with said symbol nodes X_i and Z_k (computational node D_k is block 502), wherein said computational node C_i is in communication with said state nodes S_i and S_{i-1} (in FIG. 5 block 501 output 550 and inputs 541 and 542) and said computational node D_k is in communication with said state nodes $[_k$ and $[_{k-1}$ (in FIG. 5 block 502 output 560 and inputs 540 and 532); means for a computational node C_{i+1} in communication with the state node S_i (in FIG. 5 block 501 inputs 541 and 542); means for a computational node C_{i-1}, in communication with said

state node S_{i-1} (in FIG. 5 block 501 output 550); means for a computational node D_{k+1} in communication with said state node [$_k$ (in FIG. 5 block 502 inputs 540 and 532); and means for a computational node D_{k-1} in communication with said state node [$_{k+1}$ (in FIG. 5 block 502 output 560), wherein computational nodes C and D at different time instances are configured for updates in accordance with a update triggering schedule.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Admission as applied to claim 1 above, and further in view of Xu (US 20010052104).

As per claim 15, Admission discloses claim 1. Admission in FIG. 5 discloses a method for decoding a sequence of turbo code where the updating of the channel nodes R_x, R_y and R_z based on the received channel output includes receiving at the channel node R_x the channel output associated with a symbol X_i; receiving at the channel node R_y the channel output associated with a symbol Y_i; receiving at the channel node R_z the channel output associated with a symbol Y_k; passing from the channel node R_x a next value of the symbol X_i, based on the received channel output, to the symbol node X_i; passing from the channel node R_y a next value of the symbol Y_i, based on the received channel output, to the symbol node Y_i; and passing from the channel node R_z a next value of the symbol Z_k, based on the received channel output,

to the symbol node Z_k. FIG. 5 doesn't teach that the next value is a representation of the likelihood of the value, but this is inhering in the process of turbo decoding, a new update in a value will represent the likelihood of this value in comparison with the previous value, this is very well known in turbo decoding process and Xu teaches the process of passing from the channel node R_x a likelihood of the symbol X_i, based on the received channel output, to the symbol node X_i; passing from the channel node R_y a likelihood of the symbol Y_i, based on the received channel output, to the symbol node Y_i; and passing from the channel node R_z a likelihood of the symbol Z_k, based on the received channel output, to the symbol node Z_k (Figure 3 page 2 paragraph [0018]). Teaches of FIG. 5 and Xu teachings are analogous art because they are from the same field of endeavor. Even it is inherit in FIG. 5 at the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the likelihood of the value as disclosed by Xu with the turbo decoder disclosed in FIG. 5. The suggestion/motivation for doing so would have been to determine when to stop the iteration process. Therefore, it would have been obvious to combine Admission with Xu to obtain the invention as specified in claim 15.

As per claim 16, Admission in FIG. 5 shows a method for decoding a sequence of turbo code where the initializing outgoing messages from symbol nodes X_i, Y_i and Z_k includes: passing a message from the symbol node X_i to the computational node C_i of the computational node C, where the message is based on a summation of incoming messages at the symbol node X_i (FIG. 5 input 541 of block 501 with previous values input 542 of block 501); passing a message from the symbol node X_i to the

computational node D_k of the computational node D, where the message is based on a summation of incoming messages at the symbol node X_i (FIG. 5 input 532 of block 502 with previous values input 540 of block 502); passing a message from the symbol node Y_i to the computational node C_i (FIG. 5 input 542 of block 501); and passing a message from the symbol node Z_k to the computational node D_k (FIG. 5 input 540 of block 502). It is inherit that passing a message from the symbol node Y_i to the computational node C_i is based in the likelihood of the data symbol (input 541 of block 501). It is inherit that passing a message from the symbol node Z_k to the computational node D_k is based in the likelihood of the data symbol (input 532 of block 502). This is very well known in turbo decoding process and Xu teaches that passing a message from the symbol node Y_i to the computational node C_i is based in the likelihood of the data symbol (Figure 3 L_a page 2 paragraph [0018]). It is inherit that passing a message from the symbol node Z_k to the computational node D_k is based in the likelihood of the data symbol (Figure 3 L_{e1} page 2 paragraph [0018]). Teaches of FIG. 5 and Xu teachings are analogous art because they are from the same field of endeavor. Even it is inherit in FIG. 5 at the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the likelihood of the value as disclosed by Xu with the turbo decoder disclosed in FIG. 5. The suggestion/motivation for doing so would have been to determine when to stop the iteration process.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hagenauer (US 5761248 A) discloses a method and

arrangement for determining an adaptive abort criterion in iterative decoding of multi-dimensionally coded information using a similar decoder.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
10-12-2005

Kevin M Burd
KEVIN BURD
PRIMARY EXAMINER